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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,972	10/24/2003	Victor Y. Chiu	H0003683	1840

128 7590 09/06/2006

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EXAMINER	
MEHRMANESH, ELMIRA	

ART UNIT	PAPER NUMBER
2113	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/692,972	CHIU ET AL.	
	Examiner	Art Unit	
	Elmira Mehrmanesh	2113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 24 October 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 24 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

The application of Chiu et al., for a "Fail-operational global time reference in a redundant synchronous data bus system" filed October 24, 2003, has been examined.

Claims 1-30 are presented for examination.

Information disclosed and listed on PTO 1449 has been considered.

Claims 1-7 are rejected under 35 USC § 103.

Claims 8-30 are rejected under 35 USC § 102.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 29-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

As per claim 29, the limitation "program product" is directed to non-statutory subject matter. Computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer, which permit the computer program's functionality to be realized.

Furthermore the limitation of "signal-bearing media" is directed to non-statutory subject matter. Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. A claimed signal is clearly not a "process" under § 101 because it is not a series of steps. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in § 101.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eidson (U.S. Patent No. 6,665,316) in view of Birkedahl et al. (U.S. Patent No. US 6,133,846).

As per claim 1, Eidson discloses an apparatus for providing a fail-operational global time reference (Fig. 1) the apparatus comprising:

a unique constant (col. 3, lines 61-62) stored in each timing server (Fig. 1, elements 52, 40, 42, 44)

wherein each said timing server of said first and second pluralities of timing servers is configured to independently and automatically execute a selection protocol responsive to a failure of a timing master (col. 3, lines 29-32) to select one timing server from among the first and second pluralities of timing servers to be a replacement timing master (Fig. 2, element 66) based upon synchronization signals received from at least one timing server of said first and second pluralities of timing servers and upon a relationship among said unique constants stored in said timing servers (Fig. 2, element 52, *Master clock information*) and (Fig. 2, element 40, 42, 44, *Local clock information*)

Eidson fails to explicitly disclose a redundant bus system.

Birkedahl teaches:

a redundant synchronous data bus system (col. 6, lines 12-21) including a first primary data bus (Fig. 3, element 107L), a second primary data bus (Fig. 3, element 107R), a first redundant data bus (Fig. 3, element 107LB), and a second redundant data bus (Fig. 3, element 107RB),

a first plurality of timing servers cross-coupled to said first data buses and configured to receive timing synchronization signals from said second primary data bus (col. 6, lines 22-35)

a second plurality of timing servers cross-coupled to said second data buses and configured to receive timing synchronization signals from said first primary data bus (col. 6, lines 22-35)

It would have been obvious to one of ordinary skill in the art at the time the invention to use the method of time organization in a synchronized system of Eidson's in combination with the low cost redundant communication system of Birkedahl et al.

One of ordinary skill in the art at the time the invention would have been motivated to make the combination because Eidson discloses a synchronized communication system (col. 2, lines 24-26) in which the communication link can be implemented in a variety of communication mechanisms (col. 3, lines 1-9). Birkedahl et al. discloses a redundant communication system with primary and backup data buses for a more reliable communication (Fig. 3).

As per claim 2, Eidson discloses each said timing server is configured to produce a timing master synchronization signal when selected as timing master (Fig. 2, element 64).

As per claim 3, Eidson discloses each said timing server includes a counter (Fig. 5, element 240).

As per claim 4, Eidson discloses each said timing server is configured to transmit, receive, and monitor synchronization signals from each of said first and second pluralities of timing servers (Fig. 4) and wherein each said counter (Fig. 5, elements 202, 204) is responsive to a monitored failure (col. 3, lines 29-32) and (Fig. 2, element 62) of said timing master synchronization signal to initiate counting from a starting point to count toward each respective stored unique constant (Fig. 4 and 5).

As per claim 5, Eidson discloses each said timing server is further configured to transmit a master timing synchronization signal when said counter in said timing server has completed counting to said unique constant stored in said timing server (col. 7, lines 40-49).

As per claim 6, Eidson discloses each said timing server is configured to self test its timing synchronization signal (col. 6, lines 50-60).

As per claim 7, Eidson discloses each said timing server is configured to test the timing synchronization signals of other timing servers (col. 6, lines 50-60).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 8-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Eidson (U.S. Patent No. 6,665,316).

As per claim 8, Eidson discloses a timing server for providing a fail-operational global time service (Fig. 1) for a synchronous data bus system (col. 3, lines 29-32) interconnecting at least one plurality of timing servers (Fig. 1) coupled to at least one data bus (Fig. 1, element 12) in said synchronous data bus system (col. 2, lines 17-21), the timing server comprising:

a first module configured to transmit synchronization signals and to receive and monitor synchronization signals from each timing server of said at least one plurality of timing servers (Fig. 1, element 20,22,24)

a second module configured to store a unique constant (Fig. 1, element 52) and (col. 3, lines 61-62)

and a third module configured to independently and automatically select one or more timing servers from among the at least one plurality of timing servers to be timing masters (Fig. 2, element 66) based at least partially upon a relationship among unique constants associated with each timing server and upon said synchronization signals received from one or more of said timing servers of said at least one plurality of timing servers (Fig. 2, element 52, *Master clock information*) and (Fig. 2, element 40, 42, 44, *Local clock information*).

As per claim 9, Eidson discloses said third module is further configured to synchronize to said synchronization signal from said timing master upon first reception of said synchronization signal from said timing master (Fig. 2, element 64).

As per claim 10, Eidson discloses said third module is further configured to transmit a timing master synchronization signal responsive to receiving timing master synchronization signals from two or more other timing servers for more than a predetermined period of time (Fig. 2, element 64).

As per claim 11, Eidson discloses an apparatus for providing a fail-operational global time service (Fig. 1) for a synchronous data bus system (col. 3, lines 29-32) interconnecting at least one plurality of timing servers (Fig. 1) coupled to at least one data bus (Fig. 1, element 12) in said synchronous data bus system (col. 2, lines 17-21), wherein:

each said timing server of the at least one plurality of timing servers is initially configured to transmit synchronization signals and to receive and monitor synchronization signals from each timing server of said at least one plurality of timing servers (Fig. 2)

each said timing server of the at least one plurality of timing servers is configured to store a unique constant (Fig. 1, element 52) and (col. 3, lines 61-62)

and each said timing server of the at least one plurality of timing servers is configured to independently and automatically select one or more timing servers from among the at least one plurality of timing servers to be timing masters (Fig. 2, element 66) based upon said synchronization signals received from one or more of said timing servers of said at least one plurality of timing servers and based upon a relationship among said unique constants stored in each timing server (Fig. 2, element 52, *Master clock information*) and (Fig. 2, element 40, 42, 44, *Local clock information*).

As per claim 12, Eidson discloses each said timing server of the at least one plurality of timing servers is further configured to synchronize to said synchronization signal from said timing master upon first reception of said synchronization signal from said timing master (Fig. 2, element 64).

As per claim 13, Eidson discloses each said timing server of the at least one plurality of timing servers is further configured to transmit a timing master synchronization signal responsive to receiving timing master synchronization signals

from two or more other timing servers for more than a predetermined period of time (Fig. 2, elements 62, 64).

As per claim 14, Eidson discloses each said timing server of the at least one plurality of timing servers is further configured to:

count toward a unique predetermined constant in response to detection of a failure of the timing master synchronization signal to which said each timing server is synchronized (col. 7, lines 40-53)

if no other timing master synchronization signal is received before said counting reaches said unique predetermined constant, transmitting a timing master synchronization signal; and if a timing master synchronization signal is received before said counting reaches said unique predetermined value, synchronizing to said received timing master synchronization signal (Fig. 4).

As per claim 15, Eidson discloses a method of selecting a timing master in a fail-operational global time reference in a synchronous data bus system (Fig. 1) having at least one plurality of timing servers (Fig. 1) coupled to at least one data bus (Fig. 1, element 12) in said synchronous data bus system (col. 2, lines 17-21), one said timing server acting as a timing master (Fig. 1), the method comprising the steps of, in each operable timing server of the at least one plurality of timing servers:

detecting a failure (col. 3, lines 29-32) of the timing master synchronization signal (Fig. 2, element 62)

counting toward a unique predetermined constant (Fig. 4) in response to detection of the failure of the timing master synchronization signal (Fig. 2, element 62)

if no other timing master synchronization signal is received before said counting reaches said unique predetermined constant, transmitting a timing master synchronization signal (col. 4, lines 4-8)

and if a timing master synchronization signal is received before said counting reaches said unique predetermined value, synchronizing to said received timing master synchronization signal (col. 4, lines 9-12).

As per claim 16, Eidson discloses a timing master responding to reception of a timing master synchronization signal from another timing server by the step of ceasing to produce a timing master synchronization signal after a predetermined period of time (Fig. 2, element 62).

As per claim 17, Eidson discloses the step of transmitting a timing master synchronization signal in response to receiving timing master synchronization signals from two or more timing servers for a period longer than a predetermined period (Fig. 2, elements 60, 62).

As per claim 18, Eidson discloses the step of performing one or more tests on synchronization signals received from each timing server of the plurality of timing servers and adapting said one or more tests responsive to one or more failed tests (Fig.

2, element 66).

As per claim 19, Eidson discloses a method executed in a local timing server (Fig. 1) coupled to at least one data bus (Fig. 1, element 12), the method comprising the steps of:

monitoring a timing master synchronization signal from a first remote timing server (Fig. 2 and 4)

counting toward a unique constant in response to detecting a failure of said timing master synchronization signal in said monitoring step (Fig. 2, element 66)

and synchronizing to a second remote timing server as timing master if a master timing synchronization signal is received from said second remote timing server during the counting step and otherwise transmitting a timing master synchronization signal (Fig. 2, elements 64, 66).

As per claim 20, Eidson discloses receiving a second master synchronization signal from a third remote timing server; and synchronizing to said third remote timing server as timing master (Fig. 3).

As per claim 21, Eidson discloses the step of said local timing server ceasing to transmit the timing master synchronization signal (Fig. 2, element 62).

As per claim 22, Eidson discloses two timing master signals from said second and third remote timing servers are received for more than a predetermined amount of time (Fig. 2, elements 60, 62), the method further comprising the steps of:

counting toward said unique constant (Fig. 2, elements 62, 66)

and synchronizing to a fourth remote timing server as timing master if a master timing synchronization signal is received from said fourth remote timing server during the counting step and otherwise transmitting a timing master synchronization signal (Fig. 2, element 66).

As per claim 23, Eidson discloses a timing master synchronization signal is no longer being received, the step of counting further comprising the steps of operating said local timing server automatically and independently until said synchronizing step (Fig. 2, elements 62, 66).

As per claim 24, Eidson discloses monitoring the synchronization signal from each timing server (Fig. 4); and determining failure of timing synchronization signals from remote timing servers based at least in part on the step of monitoring (Fig. 2, elements 62, 66).

As per claim 25, Eidson discloses comparing an actual time of arrival of a first synchronization signal to the designed time of arrival of the first synchronization signal and to a predetermined tolerance (Fig. 4)

and determining that the timing server has failed if a difference between the actual time of arrival of the first synchronization signal and the designed time of arrival of the first synchronization signal exceeds the predetermined tolerance (col. 6, lines 50-60).

As per claim 26, Eidson discloses measuring a temporal gap between the time of arrival of said first synchronization signal and the termination time of a prior, second synchronization signal (col. 6, lines 45-55)

and determining whether the first synchronization signal or the second synchronization signal has failed based, at least in part, on the size of said gap (col. 7, lines 1-5).

As per claim 27, Eidson discloses monitoring timing parameters of the local timing server to determine internal timing integrity (Fig. 2 and 4)

and determining failure of said local timing server based at least in part on the step of monitoring timing parameters of the local timing server (col. 6, lines 60-65).

As per claim 28, Eidson discloses each timing server is designed to produce a frame tick periodically to within a frame tick tolerance (Fig. 4), the step of monitoring further comprising the steps of:

comparing an actual frame tick period with the designed frame tick period and said frame tick tolerance (col. 6, lines 50-60)

and determining that said timing server has failed if a difference between the actual frame tick period and the designed frame tick period exceeds the frame tick tolerance (col. 6, lines 45-65).

As per claim 29, Eidson discloses a program product, comprising:

A) a set of instructions executable by a timing server to automatically and independently select a timing master from among a plurality of identically instructed timing servers (Fig. 2, element 66) coupled to at least one bus (Fig. 1, element 12) in said synchronous data bus system (col. 2, lines 17-21), wherein said selection is made based upon time synchronization signals received by said timing server and further based upon a constant unique to each said timing server; B) signal-bearing media bearing the set of instructions (Fig. 2, element 52, *Master clock information*) and (Fig. 2, element 40, 42, 44, *Local clock information*).

As per claim 30, Eidson discloses said signal-bearing media comprises a memory in a timing server (col. 2, lines 60-67).

Related Prior Art

The following prior art is considered to be pertinent to applicant's invention, but nor relied upon for claim analysis conducted above.

Bell et al. (U.S. Patent No. 6,658,579), "Network device with local timing systems for automatic selection between redundant, synchronous central timing systems".

Godbole (U.S. Patent No. 6,606,675), "Clock synchronization in systems with multi-channel high-speed bus subsystems".

Yamasaki (U.S. Patent No. 5,357,491), "Clock selection control device".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elmira Mehrmanesh whose telephone number is (571) 272-5531. The examiner can normally be reached on 8-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert W. Beausoliel can be reached on (571) 272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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